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METRIC SYSTEM

This Fisheries Bulletin, an FAO publication, uses the metric system of units to measure quantities in terms of weight, volume, capacity, length, and area. "Tons" and "quintals", when not specified by a descriptive adjective, therefore mean "metric tons" (1,000 kilograms) and "metric quintals" (100 kilograms), respectively.

In the case of monetary values, the currency units are defined by the adjective but unless otherwise specified the term "dollars" refers to U.S.A. dollars

CONVERSION FACTORS

(a) General: Non-metric units to metric units:

Converted from	To:	Multiplier
Pounds	Metric tons	0.0004536
Hundredweight (112 pounds)	" "	0.0508
Hundredweight (100 pounds)	" "	0.04536
Quintal (112 pounds)	" "	0.0508
Short ton (2,000 pounds)	" "	0.9072
Long ton (2,240 pounds)	" "	1.0161
U.S.gallons	Liters	3.7853
Imperial gallons	"	4.546

(b) Fisheries Products: Capacity and numbers to metric weight units:

Converted from:	To:	Multiplier
Hectoliter (herring)	Metric tons	0.093

(c) Fisheries Products: "Yield" factors:

Converted from:	To:	Multiplier
Wet-salted cod and allied species	Dried basis	0.66

SYMBOLS USED IN TABLES

... Not available ø Negligible - Nil

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PREFACE

Some of the more important features of the world's tuna fisheries (including bonito) are briefly outlined in text and tabular form in this number of the Bulletin. In view of the importance of these fisheries and the awakening interest now being shown in their expansion, this introductory outline is presented for member governments and others interested in tuna landings, the tuna-canning industry, and prices or marketing of tuna. Such a summary should prove of value to member countries at meetings dealing with the management, development, and protection of tuna and bonito fisheries, as well as provide a background for a more detailed analysis of the tuna situation in the various regions of the world.

GENERAL ASPECTS OF THE WORLD'S TUNA FISHERIES

Introduction

Tuna (see the note on terminology on p.93) were caught even in ancient times in the waters of the Mediterranean, notably by Greek fishermen during the sixth century B. C., and in the Western Pacific region around the Japanese Islands. Up to the first decade of the twentieth century these were the only areas where tuna fisheries were of commercial importance.

As a result of successful tuna-canning experiments in California in 1905-7, a consumers' market for canned tuna developed within the United States of America during the next decade. The swift expansion of this market encouraged a rapid development of tuna fisheries and the establishment of an important tuna-canning industry in California. It also influenced tuna production in other parts of the world. Existing tuna fisheries (especially those of Japan), while continuing to cater to their traditonal markets, adapted themselves to supplying the species and products demanded by the new U.S. market.

U.S. tuna fisheries expanded westward into the Pacific and southward along the Pacific coastline of Central and South America. During the late thirties, certain Latin-American countries on the Pacific Ocean (Mexico, Costa Rica, Peru) also turned their attention to the tuna stocks off their coasts. World War II intensified the interest of these countries and stimulated that of other Latin-American countries (Ecuador, Chile).

From 1937 on, albacore was caught off the northwestern coast of the U.S.A. Landings and canning of this species of tuna in Oregon and Washington took place during this period. These albacore also provided the basis for a British Columbian fishery and for the first Canadian canned pack in 1948.

In the Western Pacific region, during the thirties especially, Japan extended fishing operations farther to the east into the Pacific Ocean and farther to the south. These activities and the expansion of the U.S. market created an interest in the possibilities for tuna fisheries in Australia and other countries previously uninterested in fishing for tuna.

The Portuguese developed tuna fisheries off the coast of their African colony, Angola, before World War II and continued to expand them during the war years. The war gave impetus to the growth of fisheries and fish canneries in the southern part of Africa; these enterprises are planning to extend their activities to tuna fishing and tuna canning.

Utilization of Tuna

The species of tuna as caught are utilized in several ways and are finally marketed in different forms. Because of this variety of commodities there is no single world market for tuna but there are distinct regional markets for specific commodities, such as dried tuna, fresh tuna, canned tuna, etc.

In Japan, the skipjack has been used as "sashimi" (raw fish) and as "katsuobushi" (boned, steamed, smoked, and dried fillets) since ancient times. The dark red-fleshed

bluefin is consumed mainly in the raw state. The firm-fleshed, pink-colored yellowfin (which reached an important position only in the late thirties) can be eaten raw, and the development of a strong market for it as "sashimi" is possible. The soft-fleshed albacore, which was never accepted by Japanese for "sashimi," became important as raw material for canneries supplying the foreign export markets; in the future yellowfin may be used likewise.

In the United States of America, the important consumer demand is for canned tuna. The consumers' market for fresh tuna is very small and confined almost entirely to Pacific coast states and the New England and Middle Atlantic states. In the early thirties, practically all of the small Atlantic catch of the U.S.A., the fresh tuna imported from Canada (which entered the U.S.A. through Massachusetts, Maine, and New Hampshire), and about half the Hawaii catch were intended for immediate table use. Only 1 percent of the California landings was used fresh, the remainder being canned; purse-seine-caught bluefin is almost the only species that is handled in the fresh tuna markets in California.

The market for boiled and dried tuna in the U.S.A. is almost non-existent, a negligible amount being consumed by the Asian population.

Since the U.S.A. is the world's most important consumers' market for canned tuna, a further detailed analysis of the types of canned products appearing in U.S. retail trade is presented.

The U.S. pack of canned tuna is graded as "fancy," "standard," "grated" or "shredded", and "flaked". Rule 1 of the Trade Practice Rules for the Tuna Industry, which were promulgated in revised and extended form on 23 June 1940 by the U.S. Federal Trade Commission, defines the meanings attached to these terms regarding the type of pack.

Upon the species used as a raw material depend the characteristics of the canned product. "White meat tuna" is always albacore; the other three tunas (bluefin, yellowfin, and skipjack) provide the "light meat tuna" pack. In U.S. statistics "bonito" and "yellowtail" packs are often included in the "tuna and tuna-like species" figures, despite the fact that yellowtail (Seriola) is not closely allied. Bonito, a closely allied species to the tunas, cannot be labeled as "tuna" in the U.S.A. The true mackerels are sometimes canned tuna-style.

In addition to these major grades of canned tuna packs there are the "specialty" packs. Among these, the "tonno" pack is designed for the Italo-American market, the raw material being yellowfin, skipjack, or bluefin (this latter being the most favored of all). Olive oil is used in this pack instead of the cottonseed or soybean oil of the usual U.S. style. There are also other "specialty" packs, such as the "tuna in glass," "tuna in aluminum cans," "tuna in brine," "creamed tuna," "garlic'flavored tuna," and "ventresca."

In the European-African area the canned packs consist predominantly of the "tonno" style, i.e., a heavily-salted olive-oil-packed process. A part of the catch is processed as an ingredient of canned "antipasto."

In the northwestern Indian Ocean the tuna, except for small quantities utilized by canning plants that functioned in Italian Somaliland, are dried and/or salted for shipment to the consuming areas of India, Ceylon, and British East Africa. Ceylon imports annually several thousand tons of Maldive fish, a cured product utilizing a tuna species as raw material.

The utilization of tuna raw material for oil and meal is almost entirely a by-product of the tuna-canning industry, for only the canning wastes are converted to oil and meal. During the thirties an additional use for tuna livers was found to be the manufacture of vitamin oils.

Fishing Methods

The techniques of catching the migratory pelagic tunas (including bonitos) are the following:

1. Pole fishing with live bait (for "chumming" purposes) and artificial lures for surface fishing
2. Long lines with natural bait for deep fishing
3. Purse seines from fishing craft
4. Set nets fixed in inshore waters
5. Haul seines from suitable shores (beaches)
6. Miscellaneous methods, such as trolling, harpoons with torches, trap nets, and pound nets.

The pole-fishing technique operated from fishing craft is the most prevalent method used. Here, obviously, a basic necessity is availability of sufficient supplies of live bait. Bait fisheries, auxiliary to the tuna fisheries, have developed in both the U.S.A. and Japan.

In Japanese coastal waters, pole and line, long line, and the set-net are of major importance. In offshore fisheries, the skipjack pole and line and the tuna long line are the techniques in exclusive use.

On the U.S. Pacific coast, the only methods used are pole and line fishing (with live bait), trolling from the tuna clippers, and purse-seining from craft which are converted to tuna-catching in the slack season for catching sardines and salmon.

In the Mediterranean and on the west coast of Europe, the drift net, shore seines, pounds nets, trolling lines, harpoons, and spears with torch lights are all methods employed to take tuna.

In the northwestern Indian Ocean along the coast of Arabia, trolling is the usual method for taking tuna.

WORLD LANDINGS OF TUNA

Statistical Review of the World's Tuna Production

An examination of Table 55 will indicate that the total of tuna world landings must have exceeded 200,000 metric tons by 1930 and by 1940 have reached 350,000 metric tons. During the war years that followed, the landings steadily decreased until they were below 200,000 metric tons per year in 1945, but, since 1946, especially as a result of the increased output of U.S. fishermen, they again show an increase.

Reviewing the world landings by regions it will be noticed that the production of the Pacific Ocean is by far the largest. In the western Pacific Japan's output was the largest in the world until 1943 when the war curtailed Japanese fishing activities.

Table 56 indicates the increase of Japanese tuna fishing industries around their mandated islands in the decade preceding the outbreak of war. The Philippine Republic, Korea, and Hawaii produced comparatively small quantities of tuna.

The eastern Pacific, especially because of the catch by U.S. fishermen from California ports, ranked as the next important tuna-producing region in the world. (See Table 57.) Since 1944 the U.S.A. has become the world's largest producer of tuna, most of which is caught in Pacific waters. Canada landed only small quantities of tuna on the Atlantic east coast but since 1947 an important albacore fishery has developed off British Columbia, also resulting in a similar development of fisheries off the coasts of Washington and Oregon in the U.S.A.

The demand of California canneries for greater supplies of tuna encouraged U.S. fishermen to extend their range of operations farther offshore by means of improved and enlarged tuna clippers and to go farther southwards to fish in waters adjacent to the Pacific coastline of the Latin-American Republics in Central America and the northern part of South America. It is difficult to assess with satisfaction the output from this area not already included in the U.S. landings. These Latin-American Republics (Mexico, Costa Rica, Panama, Peru, and now Ecuador) became interested in developing their tuna and bonito fisheries. Peru, having large numbers of bonito in its inshore waters, found it feasible to fish for this species with comparatively small boats and Peruvian output increased rapidly from less than 6,000 metric tons of bonito in 1942 to nearly 19,000 metric tons by 1945. (See Table 58.) Small quantities of albacore, skipjack, and yellowfin are also landed and canned at Peruvian ports.

Northwestern Europe as a region does not produce large quantities of tuna, but tuna landings in Denmark, Germany, Norway, and Sweden are sufficient to indicate the wide range of the various tuna species. (See Table 59.)

The Mediterranean since ancient times has been a tuna-producing area and various species of the Thunnidae and Sarda have been caught and used for many centuries B.C. on both the European and African coasts of the Mediterranean. Table 60 gives a statistical report on the tuna production of the Mediterranean area. It should be noted that the figures for countries such as Spain, Portugal, and France include the tuna catch from the Atlantic Ocean in areas such as the Bay of Biscay and farther south along the coast of the Iberian Peninsula and northwest Africa. Taking into account the lack of information on many of the smaller producers in this area, it appears to be a safe estimation to place the landings in this region during 1930-48 from 20,000 to 40,000 metric tons per year.

The tuna stocks in the southeast Atlantic waters adjacent to the coast of the Portuguese colonies of Angola have led to the establishment of an important tuna fishery. The rapidly expanding fisheries industries of the Union of South Africa and of South West Africa along the Atlantic coast are also interested in the possibilities of tuna and tuna canning in the South Atlantic region.

In the waters of the northern Indian Ocean, some tuna species have been caught and utilized. Statistics on the magnitude of the catch and landings are not available but it is not insignificant, as is indicated by the fact that the processed weight of Ceylon imports of Maldive fish alone (a dried commodity prepared from only one tuna species) in certain years exceeds 4,000 metric tons per annum. The presence of processing factories for tuna in Italian Somaliland before World War II and the intention to establish factories in British Somaliland in the postwar years indicated the availability of tuna in the waters adjacent to these territories. Tuna is also being caught, dried and/or salted, along the coasts of Arabia (Muscat and Oman) for shipment to India, Ceylon, and East Africa.

Tuna Landings in Japan Proper

According to prewar statistics Japan is the world's largest primary producer of tuna. It is also the world's largest consumer of fresh, raw, and cured (i.e., boiled and dried) tuna. From the coastal and offshore fishing areas, fishermen based on Japan Proper landed annually 131,100 metric tons of skipjack and other tuna on an average for the 20-year period 1920-39. The bulk of these quantities was obtained from the offshore fisheries, which supplied 61 percent of the landings in 1920-24 and 75 percent in the three 5-year periods, 1925-29, 1930-34, and 1935-39.

During the whole interwar period Japanese landings show a steady upward trend, as a continuation of developments before and during World War I. Tables 61 and 62 provide the statistical data reflecting this upward trend, which became pronounced in 1930-39. During this decade the Japanese tuna fisheries were stimulated by several factors: (a) a rising domestic demand owing to the Far Eastern military situation during the thirties; (b) the decline in the U.S. albacore output after 1926, thus creating a demand for Japanese-caught fresh and frozen albacore in the California canneries; and (c) the expanding U.S. market for canned tuna, which provided an outlet for the Japanese production of canned albacore.

The Japanese cannery market demanded skipjack; the U.S. cannery market required albacore. The sources for Table 62, giving the percentage composition of landings in Japan according to species, list skipjack separately, but group albacore with the other tunas. Skipjack, the most important species for the fresh, raw, and boiled and dried tuna markets of Japan, accounted for 76.2 percent of the total tuna catch in 1920-24, 62.7 percent in 1925-29, 55.0 percent in 1930-34, and 58.9 percent in 1935-39.

The absolute increase in the landings of "Other tuna," as well as the growth of their relative importance during the years 1930-39, is an indication that Japan's production was being geared to the export markets, especially that of the U.S.A., for canned tuna and cannery raw materials - particularly albacore, the highly prized "white meat" tuna.

Tuna Landings in the U.S.A.

Practically all the U.S. catch of tuna is landed on the Pacific coast; the Atlantic landings (mostly bluefin and bonito) accounted for only about 2 percent of the annual landings during 1927-46 and never aggregated more than 1,600 metric tons. Until 1937, the U.S. Pacific coast landings of tuna were confined to California ports, notably San Diego and San Pedro. In that year and in subsequent years, albacore were taken off the north-western coast of the U.S.A. and landings of this species have been made in Washington and Oregon. A company in Houston, Texas, plans to fish for tuna in the Pacific waters off South and Central America; the catches are to be landed in Texas for canning purposes.

During the years 1911-17, the whole Pacific coast catch was taken in the waters off the U.S. coastline. In 1918-26, 80 percent was caught in these waters, while the remaining 20 percent came from the areas south of the U.S. - Mexican border. In the following decade, 1927-36, only 16 percent of the Pacific coast tuna landings were taken off the U.S. coast. This extension of tuna operations increased operating costs and necessitated the introduction of larger-sized boats, requiring greater capital investments. Fishing for tuna in the waters adjacent to Mexico and the Central American countries caused international controversies (regarding fishing permits, fees, territorial waters, etc.) in respect not only to tuna fishing, but also to the auxiliary bait fisheries.

Tables 63 and 64 provide the statistical series reflecting the general upward trend of landings during the period 1920-48. This is a continuation of the tuna landing trends since 1911-12, when tuna canning first began to be established, reaching commercial importance in the U.S.A. by 1914.

Tuna landings on the Pacific coast after World War I continued to increase annually from 16,800 metric tons in 1922 to 32,200 in 1927 and 47,400 in 1930. The 1931 decline to 27,100 tons can be attributed to a large pack in 1930 and large stocks of canned tuna on hand at the beginning of the fishing season, together with the economic crisis already reached in 1931 and disagreements and litigations between fishermen and canners, etc. Landings subsequently recovered and reached 73,800 tons in 1937; the peak for the period immediately preceding the entry of the U.S.A. into World War II was reached in 1940, when 95,300 tons were landed. During the war, half the tuna fleet was taken over by the armed services. A downward trend followed, as war conditions, creating shortage in supplies, craft, and manpower, interfered with fishing operations and a low point was reached in 1942, when 53,600 tons were landed. Subsequent developments during the postwar years broke all prewar records; 99,800 tons were landed in 1946, and 118,700 tons in 1947. The 1948 catch of 143,500 tons, the highest on record, exceeded the annual average Japanese production in 1920-39 by 12,000 metric tons, but was lower than the Japanese output in Japan's peak year 1940, when 202,400 tons were landed.

Table 64 contains the percentage composition of Pacific coast landings by U.S. fishermen and craft according to the five tuna species. Shifts in the composition of the landings according to species are important for the bearing they have on the type, quality, and value of the canned packs.

Albacore was the most important species during the early decades of the U.S. tuna fisheries. It is still the most highly prized of the tunas as the raw material for "white meat" canned tuna. The albacore disappeared almost completely from California waters during 1926-37. Since 1927 yellowfin tuna has been the main raw material landed by U.S. fishermen for the California cannery market. During the 20 years 1920-39, yellowfin accounted for 50.4 percent of the landings, skipjack for 23.5 percent, bluefin for 12.3 percent, albacore for 9.4 percent, and bonito for 4.4 percent.

The decline in albacore landings had a very important implication - the encouragement of Japanese exports to the U.S.A. of fresh and frozen albacore and the development of Japanese canneries producing canned albacore for the U.S. market. Previously the Japanese, while fishing primarily for skipjack for their domestic market, neglected available albacore stocks.

TUNA-CANNING INDUSTRIES

As the U.S. tuna-canning industry is the most important one in the world at present, it is discussed first. The Japanese tuna-canning industry is reviewed next, as it was, during the prewar years, second in rank of importance. The third section is devoted to a short survey of tuna-canning operations in other parts of the world.

The Tuna-Canning Industry of the U.S.A.

During the first decade of the 20th century the California sardine-canning industry experienced great difficulties as a result of the failure in the pilchard catches followed by marketing difficulties caused by food and drug regulations necessitating drastic changes in the labeling of the canned pilchard product. One of these firms, encountering serious foreign competition, especially from Norway, began experiments with the canning of other species, including tuna, in 1905-07. The first successful commercial tuna pack of the U.S.A. was produced in 1909. Until 1911 only one firm was canning tuna in California but more firms entered the industry in 1912 and by 1914 it was well established.

U.S. production of canned tuna increased from 218 metric tons in 1911 to 4,725 tons in 1914, and 8,043 tons in 1917. In 1918 there was a severe decline in the pack to 3,732 tons, but in the next year the pack increased to 8,614 tons.

The domestic production of canned tuna and bonito shows a continuous upward trend from 1920 to 1948 except for brief declines during 1931-33 (the years of the economic crisis), and 1941-43 (critical years of World War II). From an output of 9,162 tons in 1920, production increased to 61,663 tons in 1948. The general trend on the basis of annual data for the individual years 1920-48 is indicated in Table 65; annual averages for five-year periods are given in Table 66.

In 1920-24, albacore was the most important species, constituting 53.4 percent of the total average annual production of 6,900 metric tons. The decline in the U.S. albacore fishery is reflected in the figures for the next 15 years, when the annual average for albacore, out of a total pack of 17,500 tons, amounted to only 1,745 tons, i.e., 10 percent of the pack. Yellowfin had become the most important species, accounting for 50.7 percent of the pack during these 15 years, 1925-39. During this period skipjack constituted 17.5 percent, bluefin 9.3, bluefin and skipjack as "tonno" 8.1, and bonito 4.4 percent. It will be noted that 93.1 percent consisted of quantities packed solid ("fancy" or "standard" grades) and only 6.9 percent of "flakes." The percentage of the "flaked" cans increased to 25.1 percent of the total in 1940-44, and 36.0 percent in 1945-48; "flakes" obtain a lower price than the "solid" type of product.

The composition of the American pack in terms of species and canning styles cannot be interpreted merely in terms of the species composition of U.S. landings. Before 1925 there was no canned production in the U.S.A. from imported frozen tuna, but from 1925 onwards, foreign-caught imported tuna were used. The percentages of the canned production from such imports are given in Table 70. The contribution of foreign-caught tuna to total canned supplies is analyzed in a later section.

The Japanese Tuna-Canning Industry

Japan, though it is the world's largest producer, as well as consumer, of raw fresh, boiled and dried tuna, is negligible as a market for canned tuna. The canning industry was developed to supply foreign markets.

The Japanese experimented with the canning of tuna in oil in 1906, but the average annual pack of canned tuna in Japan during 1906-19 did not exceed 40 metric tons. During the period 1920-28, Japan did not produce canned tuna but further experiments in canning were undertaken in 1926-27. After a small pack of 30 metric tons was produced in 1929, the tuna-canning industry began to expand rapidly in 1930, and by 1931 five canneries were in operation. The number of canneries increased to 16 in 1932, to 24 in 1933, and to 29 in 1937/38.

The Japanese pack of canned tuna was processed in the same manner as the California pack, since the main market for their exports was at first in the U.S.A. In May 1932, the packers formed the Tuna Packers Association of Japan to direct the tuna packers, inspect products, arrange sale controls, investigate production and market conditions in foreign countries, etc.

In 1933, 6,450 metric tons out of the total U.S. import of 6,524 metric tons of tuna canned in oil came from Japan. The Japanese packers feared that imports to the U.S.A. of such large quantities might result in severe restrictions, and they began investigating the possibilities of developing other overseas markets, especially in Europe and in Canada.

Not only the Japanese decision to restrict its exports to the U.S.A., but also the increase in U.S. import duties on canned tuna from 30 percent to 45 percent in 1904, was responsible for the decline in exports to the U.S.A. subsequent to 1933. The annual average exports from Japan of canned tuna during 1934-38 amounted to 5,382 metric tons,

of which the U.S.A. absorbed 68.7 percent, Canada 7.9 percent, and Belgium-Luxembourg 5.4 percent.

Tuna Canning in Other Parts of the World

The tuna-canning industries of the Mediterranean countries such as Spain, France, Portugal, Italy, and of the North African countries such as Morocco, Algeria, Tunisia, and Libya (Tripolitania) probably date back to the years before the establishment of the U.S. canneries in California. Tuna was canned principally in the Italian style, olive oil being used. There is no accurate information available on the canned tuna packs but during the early thirties between 2,000 and 3,000 metric tons were produced annually, accounting for about 15 percent of the world's output of canned tuna. Turkey is now undertaking to supply the United Kingdom with canned tuna but no figures on the magnitude of the canned packs are available. The Portuguese have established a tuna-canning industry for utilizing the fishery resources off the Atlantic coast of Angola, and fishing interests in the Union of South Africa also wish to develop tuna canning in this region of the southeastern Atlantic. On the other side of the African continent, the Italians, before the outbreak of World War II, operated small canneries at three centers in Italian Somaliland. A tuna-canning enterprise is said to be in process of establishment in British Somaliland.

In the Pacific, in addition to Japan which has already been discussed in detail, tuna canning was conducted since the early thirties in the Philippines and in Hawaii.

In the western Pacific the activities of California fishermen in their extensive long-range search for tuna for the California canneries, stimulated the interest of the Central and South American republics in the latent stocks of tuna off their coast. Peru especially exhibited great enterprise in developing its tuna and bonito fisheries and several canneries are now active in canning tuna and bonito. The bulk of the pack consists of canned bonito. Chile has also a canning industry producing canned bonito and small quantities of other tuna species. Ecuador is exhibiting an active interest in the establishment of tuna-fishing and -canning industries.

THE UNITED STATES AS THE MAJOR MARKET FOR CANNED TUNA

Introduction

In the early thirties New York City was the chief center of consumption in the U.S.A., which as a country constitutes the only important world market for canned tuna. The major regions where a demand for American-style canned tuna exists are along the Atlantic coast states, Pacific coast states, and in certain urban centers of the Middle West. With the decline of a large foreign-born minority, the relative importance of speciality packs might decrease.

The speculative nature of tuna fishing and the necessity for highly experienced crews and expensive craft and gear to catch the fish makes the cost of the raw material by far the most important item entering into the cost of the final end-product. Canned tuna is a high-cost food and large markets for this product can only be developed in countries where consumer income levels are high.

In the U.S.A. it is considered by some authorities that meat is the closest substitute to tuna and in comparative price studies attention is to be given between meat prices and those for tuna. It will, however, also be necessary to pay attention to an analysis between tuna and salmon prices.

The American-style pack of canned tuna was unknown before the experiments started during the first decade of the 20th century. The market for canned tuna which has expanded so rapidly in the U.S.A. really began to be established from 1914 onwards when experienced marketing firms began producing and selling the product throughout the country.

Major Sources of Supply

The consumers' market for canned tuna in the U.S.A. obtains supplies from the following sources:

1. Domestic production of canned tuna from:
   a. Tuna caught and landed by U.S. craft and fishermen;
   b. Tuna imported in a fresh or frozen condition from foreign primary producers. (See Table 67.)
2. Canned tuna imported from foreign countries processing their own tuna. (See Table 68.)

The percentage of the canned production of foreign-caught materials to the total canned output rose from 2 percent in 1925 to 10 percent in 1929, and after a decline to 8 percent in 1930 rose again to 13 percent in 1931, on the basis of computations by the U.S. Tariff Commission. In considering the percentage figure for 1931 it is to be borne in mind that in that year there was a sharp decline in the domestic landings of tuna.

Table 70 reflects the series of data indicating total available supply of raw materials from domestic landings, as well as from imports of fresh and frozen tuna, for the years 1931-48. Assuming that the same percentages of the domestic landings and of the imports are used for other purposes than canning, and assuming further that the percentual composition according to species from these two sources of supply is the same, the percentage of the domestic canned production from imported raw materials can be computed. If to these domestically-produced canned products from imported raw materials are added the imports of canned tuna there can be ascertained the percentual contribution of foreign-caught fish to total supplies available to U.S. consumers of canned tuna, provided that exports and re-exports are of no significance and are not shown separately in the U.S. trade statistics. It must be pointed out that imports consist largely of fresh and frozen albacore and that for this species the recovery-yield through canning processes on the basis of solid meat and flakes is much more favorable than for other species.

Another factor which will complicate computations in this table is that imports of canned tuna might not include all imports of bonito.

It will be noted also in Table 70 that between 1932 and 1939 imports of fresh and frozen tuna varied between 4 and 8.5 percent of the domestic landings plus imports. After 1939 they dropped to vary between 1 and 3 percent.

Imports of fresh and frozen raw materials are of minor importance in comparison with imports of canned tuna; the latter have a more definite influence on the percentage composition of total supplies. As a result of a large import of canned tuna in 1933, the total contribution of imported fish amounted to 38 percent of total supplies. In 1934-40, with the increase in U.S. production in both landings and canned tuna, together with a leveling off of imports to between 3,000 and 5,000 metric tons, the total contribution of imports to total supplies fluctuated between 11 and 22 percent. In 1941-48 imports of fresh and frozen tuna, as well as canned imports, dropped and, therefore, the percentual contribution of total imports, on the basis of the computations, declined to fluctuate between 2 and 9 percent. These figures show the comparatively insignificant role of imports during the late thirties and the war years as compared with the situation existing during the early thirties.

U.S. Import Trade in Canned Tuna

The data in Table 70, as analyzed in the preceding section, indicate that imports of canned tuna declined in relative importance after the peak year for such imports—1933. The rapid expansion in tuna landings, which were practically all used as raw material for the canned packs of the Pacific coast canneries and the absolute decline in imported quantities during the World War II years are the major factors responsible for this relative decline in the contribution of imports to total supplies. The U.S. import, although small when viewed in the light of U.S. demands, is of vital importance to the growing number of countries landing and canning tuna on a comparatively small scale. While these fisheries individually may remain comparatively small, even though they are expanding, they may need as an aggregate a very large common import market. These possibilities suggest a more detailed analysis of trends in the U.S. import trade in canned tuna for domestic consumption.

The U.S. official import trade statistics did not list "tuna canned in oil" separately before 1931. Before 1930 imports of tuna canned in oil were negligible; very small quantities packed in olive oil (tonno-style) were imported from the European countries. Table 68 gives the data on the U.S. imports of canned tuna, 1931-48. In 1931, the U.S.A. imported 425 metric tons of tuna canned in oil, of which Japan supplied 294, Mexico 89, and the European countries 42 metric tons. In 1932 Japan supplied 2,300 (85.3 percent) out of a total of 2,697 metric tons, and in 1933, 6,450 tons (98.9 percent) out of a total of 6,524 tons.

As already mentioned, with the decline of U.S. landings of albacore, the Japanese extended their fisheries to supply the California canneries with this raw material in the frozen condition. In the early thirties Japan began with the development of tuna canning on a commercial scale, producing a pack in the American style; imports of canned tuna into the U.S. from Japan increased very rapidly during 1931-33. Japan went off the gold standard on 13 December 1931 and during the months of 1932 the exchange value of the yen continued to decline until the U.S. dollar left the gold standard in April 1933. This exchange relationship might have been one of the factors favoring Japanese exports to the U.S.A.

The rapid increase of Japanese exports to the U.S.A. caused considerable apprehension in the U.S. canning industry. To prevent the possibility of active steps against their exports, the Japanese packers adopted a voluntary control measure for exports of canned tuna to the U.S.A. In 1933 the Japanese albacore catch was very small and this, together with other factors such as the increase of the U.S. import duty from 30 percent to 45 percent ad valorem in January 1934, the rise in value of the yen in terms of dollars after the U.S.A. left the gold standard in April 1933, and the voluntary control measure on the part of the Japanese packers, all contributed to a decline in 1934 imports into the U.S.A. from Japan. Although imports from Japan dropped to 3,433 metric tons, this was still the major source of supplies of imported canned tuna; Japanese canned tuna comprised 91.6 percent of total imports. The Japanese exporters now began their search for new markets especially in Canada and Belgium while the imports into U.S.A. from Japan during 1934-40 varied between 2,200 and 4,400 metric tons annually. In 1941, the last year before Japan entered the war, the U.S.A. imported only 810 tons from this source.

During the period 1934-41 the Philippine Republic was the most important Western Pacific country supplying the U.S.A. with canned tuna; imports from the Philippines which entered the U.S.A. duty free increased from 141 tons in 1934 to 651 tons by 1941.

Among the eastern Pacific countries from which the U.S.A. imported canned tuna, Mexico was the major supplying country during the years 1931-42. Imports from Peru then entered prominently into the trade; they increased from 20 tons in 1942 to 2,124 tons in 1948. Canada supplied 85 tons in 1947. From Cuba and other Caribbean countries, insignificant amounts were imported from time to time.

In 1931-39 France, French Morocco, Portugal, Spain, and Italy supplied annually between 10 and 100 tons. After the outbreak of war, Portugal, the Azores, and Spain

(neutral territories) became the chief suppliers from this area. Portuguese exports amounted to 1,000 tons in 1945. Portuguese Angola and Guinea supplied a further small quantity of the imports during the thirties and the war years.

Table 69 indicates the sources of canned-tuna imports into the U.S.A. during 1948 and the first 3 months of 1949. Imports from Japan of tuna fish in oil were resumed by August 1948 which amounted to 142 metric tons for the month of February 1949. Any interpretation of these monthly series should however bear in mind that the trend might be highly influenced by seasonal features.

U.S. Import Duties on Tuna Canned in Oil

Tuna canned in oil is covered in paragraphs 720 of the U.S. Tariff Act of 1922 and 718 (a) of the U.S. Tariff Act of 1930. Under the 1922 Act the rate of duty amounted to 30 percent ad valorem and the schedule remained unchanged under the 1930 Act. The rate of duty was raised to 45 percent ad valorem by Presidential Proclamation, effective 13 January 1934, under Section 336 of the Tariff Act of 1930.

The rate of duty was lowered to 22.5 percent as a result of a trade agreement between the U.S.A. and Mexico which became effective in January 1943. This concession is subject to withdrawal on six months' notice after the termination of unlimited national emergency proclaimed 27 May 1941. The current U.S. duty of 22.5 percent ad valorem represents the maximum reduction permissible under the terms of the amended Trade Agreements Act.

It is considered that the present rate of 22.5 percent will probably not in itself alone constitute an effective barrier against increases in the exports of other countries to the U.S.A. It may be pointed out that Japanese exports continued to increase steadily during the early thirties when the rate was 30 percent. The noticeable decline which followed in the imports from Japan after the imposition of the 45 percent ad valorem duty in January 1934 resulted not merely from the increase in the tariff duty but also from the voluntary action of the Japanese tuna packers to look for new markets and from other factors already mentioned in the preceding section.

Wholesale Prices for Canned Tuna

Wholesale prices f.o.b. at the canneries from April to June 1948 fluctuated between $14.25 to $14.50 per case of 48 half-pounds tins for the grated products; $15.25 to $17.50 for light meat; and $22.50 to $23 for albacore fancy white. By August and September the prices for grated increased to $16 while for the other two types prices remained at the levels of $16.75 for light meat and about $23 for albacore. At the end of 1948 during October, November, and December, the prices for light meat ranged from $16 to $18 and for albacore fancy white from $20 to $22.50.

Spot prices for the grated by April/May 1949 were $12.00 per case of 48 half-pound tins. The standard pack were from $14.00 to $14.50 and California albacore quoted at $20 to $22. There is an indication that the tuna prices in the various canned products have been dropping during the winter months and these have been depressing prices paid for the raw tuna.

As the raw fish prices which the canneries have to pay to the tuna fishermen constitute such a high percentage of the total costs of the canned product, there will be an important relationship between the level of the retail and wholesale prices for the canned product and the prices received by the fishermen. Table 71 indicates the tuna prices per short ton paid to fishermen from 1917-48. Prices continued to rise from 1917 until the great depression of the early thirties, when there was a slight temporary drop, and after a slight advance during the prewar years they were kept stable by the price control of the war years, to be followed by a swift increase in prices during the years 1946, 1947, and 1948. The weakening of the wholesale prices for canned tuna during the early part of 1949 caused a downward trend in raw fish prices.

The Fish and Wildlife Service of the United States reports in its latest Quarterly Outlook for Marketing Fishery Products, July-September 1949, the following:

"The tuna price controversy between canners and vessel operators, apparently settled at $310 per ton for yellowfin, $30 below the former price, delayed the departure of many vessels and has made it difficult to estimate the probable pack volume. Production early in the year exceeded that of the same period in 1948. While consumption was large and prices were well maintained in the face of the exceptionally heavy pack of 1948, it is expected that prices will rule lower during the coming quarter. Consequently, there will be less incentive to expand the packing of tuna in the Northeast, which developed on a small scale in recent years."

It is important to note that practically all fresh tuna is not sold by auction but actually disposed of at contract prices arrived at through conferences between the canneries and representatives of the Tuna Fishermen's Association. Such contract prices are subject to subsequent changes at similar conferences that may be held during the year. The prices initially agreed upon are, however, usually maintained. Between 1927 and 1935 there were only six changes in the prices of the principal variety of yellowfin and seven in the skipjack prices.

NOTE ON TERMINOLOGY

For the purpose of this brief survey of the commercial tuna fisheries of the world, attention is concentrated upon the following species in particular. There is still uncertainty as to the final version of the scientific nomenclature for some species.

(a)	Bluefin tuna)	
	Oriental tuna)	Thunnus thynnus
	Big-eye tuna)	
	Yellowfin tuna	Neothunnus macropterus
	Albacore	Germo alalunga
	Skipjack	Katsuwonus pelamis
	Little tunny	Euthynnus alleteratus
(b)	Atlantic bonito	Sarda sarda
	Pacific bonito	Sarda lineolata

Complications in tuna nomenclature often result from legal enactments passed in the producing and consuming countries restricting the use of the term "tuna" on the labels of canned commodities. In the United States of America, for instance, canned bonito may not be labeled as "tuna" under the regulations of the U.S. Food and Drug Administration and also under the Trade Practice Rules for the Tuna Industry as administered by the U.S. Federal Trade Commission. In Peru, on the other hand, by Supreme Resolution No. 738 it is permissible to label as "atun" the common Pacific bonito (Sarda spp.). Because of the use of common names not clarified by the scientific names, statistical evaluation is often difficult and studies of tunas in the past have often suffered from flaws owing to confusion in the names. For example, in Japanese publications in English "bonito" is used to refer to skipjack". When vague headings such as "tuna and tuna-like species" are used, there is often the danger that species not closely related to the tunas might be included in the statistics.

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Table 55. - SUMMARY: Landings of tuna in some countries, 1930-48

Calendar Year	Total	North-western Europe	Southern Europe and North Africa a/	North America	Latin America b/	Japan c/
	(Metric tons)					
1930	187,687	112	7,688	48,002	-	131,885
1931	185,333	93	12,004	27,764	-	145,472
1932	180,565	255	23,819	29,416	-	127,075
1933	184,311	113	11,160	32,565	-	140,473
1934	204,005	116	16,178	44,679	-	143,032
1935	214,180	217	15,395	57,216	-	141,352
1936	256,488	292	18,486	60,719	-	176,991
1937	266,215	295	22,938	74,786	126	168,070
1938	263,199	843	13,936	66,869	3,364	178,187
1939	285,099	923	10,961	83,388	3,393	186,434
1940	324,562	1,414	21,714	97,089	1,911	202,434
1941	229,256	813	27,036	62,817	838	137,752
1942	219,534	3,334	29,198	54,807	6,800	125,395
1943	182,745	156	20,057	59,485	12,459	90,588
1944	183,425	978	15,286	77,149	17,212	72,800
1945	152,013	1,092	(15,000) d/	85,206	19,815	30,900
1946	196,166	868	38,006	101,711	18,558	37,023
1947	265,017	1,192	35,207	119,863	22,505	86,250
1948	256,658	(1,000) d/	9,200	144,790	(25,000) d/	76,668

SOURCES: Other tables in this study.

a/ France, Portugal, and Spain only.
b/ Peru and Costa Rica only.
c/ Japan proper only.
d/ Figures in parentheses are estimates.

Table 56. - WESTERN PACIFIC REGION: Tuna landings, 1930-48

Calendar year	Japan	Philippine Republic	Formosa	Former Japanese Mandated Islands	Korea	Hawaii
	Metric tons					
1930	131,885	...	5,318	1,448	...	...
1931	145,472	...	4,752	3,028	...	...
1932	127,075	...	4,074	5,222	...	...
1933	140,473	...	5,101	7,254	...	...
1934	143,032	...	5,155	9,383	...	...
1935	141,352	...	4,506	12,202	130	...
1936	176,991	...	6,696	14,853	4	...
1937	168,070	...	...	33,742	17	...
1938	178,187	...	...	13,030	65	...
1939	186,434	...	...	17,381	88	...
1940	202,434	...	...	19,093	122	...
1941	137,752	...	...	...	185	...
1942	125,395	...	...	...	201	...
1943	90,588	...	...	...	...	...
1944	72,800	...	...	...	...	...
1945	30,900	...	...	...	...	...
1946	37,023	152	...	...	...	...
1947	86,250	960	...	...	...	...
1948	76,668	...	...	...	...	4,537

SOURCES: Japan: 1930-46; U.S. Department of the Interior, Fish and Wildlife Service, Japanese Fisheries Production 1908-46, Fishery leaflet No. 279, (Washington, D.C., 1948); 1947: FAO Questionnaire, Preliminary Report on Landings and Utilization; 1948: Supreme Commander for the Allied Powers, Natural Resources Section, Weekly Summary No. 179 (Tokyo, 13-19 March 1949).

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Table 57. - NORTH AMERICA: Tuna landings, 1930-48

Calendar year	Total	Canada	U.S.A.
	(..... Metric tons .....)		
1930	48,002	121	47,881
1931	27,764	71	27,693
1932	29,416	120	29,296
1933	32,565	204	32,361
1934	44,679	140	44,539
1935	57,216	144	57,072
1936	60,719	201	60,518
1937	74,786	407	74,379
1938	66,869	242	66,627
1939	83,388	574	82,814
1940	97,089	211	96,878
1941	62,817	219	62,598
1942	54,807	182	54,625
1943	59,485	213	59,272
1944	77,149	450	76,699
1945	85,206	872	84,334
1946	101,711	1,022	100,689
1947	119,863	1,136	118,727 a/
1948	144,790	1,280	143,510 a/

SOURCE: Canada: 1930-45: FAO, Yearbook of Fisheries Statistics, 1947 (Washington, D.C.,1948), Table 145, p. 185; 1946-48: Department of Fisheries (Ottawa: Special report, 21 March 1949).
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a/ Pacific coast only.

Table 58. - LATIN AMERICA: Tuna landings, 1937-47

Calendar year	Chile	Peru	Costa Rica a/	Mexico b/
	(..... Metric tons .....)			
1937	...	...	126	...
1938	...	...	3,364	...
1939	...	...	3,393	...
1940	...	...	1,911	44,609
1941	...	...	838	22,161
1942	1,397	5,718 c/	1,082	24,613
1943	...	11,967 c/	492	24,743
1944	...	16,327 c/	885	30,424
1945	...	18,711 c/	1,104	41,117
1946	1,527	16,638	1,920	53,748
1947	...	17,847	4,658	...

SOURCE: Chile: 1942: U.S. Department of the Interior, Fish and Wildlife Service, Fishery Market News (Washington, D.C., January 1944), p.20; 1946: FAO questionnaire, Preliminary Report on Landings and Utilization (Washington, D.C.).
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a/ Exports, including only those cleared through customs; fish caught off-shore and carried direct to California not shown.
b/ May also include production by U.S. tuna fishermen.
c/ Bonito only.

Table 59. - NORTHWESTERN EUROPE: Tuna landings, 1930-47

Calendar Year	Total	Denmark	Germany	Norway	Sweden
	(. . . . . Metric tons . . . . .)				
1930	112	-	47	61	4
1931	93	-	33	59	1
1932	255	118	54	83	-
1933	113	36	26	44	7
1934	116	21	22	59	14
1935	217	44	21	152	-
1936	292	165	20	98	9
1937	295	150	14	114	17
1938	843	180	121	177	365
1939	923	138	119	139	527
1940	1,414	600	-	133	681
1941	813	108	-	269	436
1942	3,334	810	-	456	2,068
1943	156	80	-	72	4
1944	978	380	-	377	221
1945	1,192	550	-	(100)	542
1946	868	590	-	100	178
1947	1,292	392	-	800	(100)

SOURCES: Denmark.- 1930-36: Conseil permanent international pour l'exploration de la mer, Bulletin statistique des pêches maritimes, (Copenhagen); 1937-47: Fiskeridirektoratet, Fiskeri-Beretning, (Copenhagen).

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Table 60. - SOUTHERN EUROPE AND NORTH AFRICA: Tuna landings, 1930-48

Calendar year	Algeria[a]	France[a]	Greece	Italy	Libya	Portugal	Spain	Spanish Morocco	Tunisia	Cyprus	Malta
	(. . . . . Metric tons . . . . .)										
1930	...	7,688	...	...	728[b]	[c]	...	...	...	...	13[d]
1931	...	12,004	...	...	920[b]	[e]	...	...	...	...	...
1932	919	8,890	2	...	1,131[b]	3,779[f]	11,150	...	...	...	...
1933	...	8,137	...	...	1,200[b]	3,023	...	2,700	569	...	...
1934	...	12,312	...	2,660	801[b]	3,866	...	...	673	...	25[g]
1935	...	11,505	...	2,000	708[b]	3,890	...	...	...	...	...
1936	...	10,655	...	2,600[h]	...	7,831	...	...	...	...	...
1937	...	10,658	...	...	942	12,280	...	...	...	...	...
1938	...	10,957	...	...	867	2,979	...	...	...	2	9
1939	...	8,247	...	...	916	2,714	...	...	...	...	...
1940	[i]	7,502[i]	...	...	...	2,412	11,800	...	...	...	...
1941	[i]	6,848[i]	...	...	...	3,384	16,804	...	...	...	...
1942	[i]	7,027[i]	...	...	...	3,839	18,332	...	...	...	...
1943	[i]	1,294[i]	...	...	...	5,278	13,485[j]	...	...	...	...
1944	[i]	769[i]	...	...	...	4,601	9,916	...	...	...	...
1945	...	...	...	...	...	3,284	...	...	...	...	...
1946	...	6,800	...	2,200	...	6,174	25,032[k]	...	...	...	...
1947	790	4,800	...	2,000	770[l]	3,283	27,124	...	...	...	...
1948	...	9,200	2,551	...	1,000	...	...	...	...	...	...

SOURCE: Miscellaneous publications.

a/ The production of Algeria may be included with the production of France.
b/ Tripolitania only.
c/ 56,900 tunnies (all sizes) and 513,496 other scombroides.
d/ Fiscal year 1 April 1930 - 31 March 1931.
e/ 67,000 tunnies (all sizes) and 60,000 other scombroides.
f/ 63,000 T. blanc; 317,000 others.
g/ Fiscal year 1 April 1934 - 31 March 1935.
h/ Data lacking from Fiume district.
i/ For these years it is definitely known that Algeria included with France.
j/ Ten months.
k/ Bonito only.
l/ Estimated.

Table 61. - JAPAN: Landings of skipjack and other tuna, 1920-46 a/

Year	Total landings			Coastal b/		Offshore	
	All species	Skipjack c/	Other tuna d/	Skipjack c/	Other tuna d/	Skipjack c/	Other tuna d/
	(Metric tons)						
1920	109,550	88,195	21,355	35,767	13,282 e/	52,428	8,073
1921	100,367	81,592	18,775	30,652	11,253 e/	50,940	7,522
1922	83,036	65,280	17,756	19,410	10,755	45,870	7,001
1923	93,909	67,784	26,125	20,028	10,192	47,756	15,933
1924	100,206	68,275	31,931	22,863	15,405	45,412	16,526
1925	102,591	69,536	33,055	21,971	14,628	47,565	18,427
1926	113,020	68,767	44,253	14,737	16,912	54,030	27,341
1927	126,211	85,701	40,510	13,488	11,043	72,213	29,467
1928	120,846	76,987	43,859	11,141	15,127	65,846	28,732
1929	132,459	72,135	60,324	11,985	17,762	60,150	42,562
1930	131,885	68,789	63,096	11,126	20,793	57,663	42,303
1931	145,472	80,343	65,129	11,366	19,361	68,977	45,768
1932	127,075	67,143	59,932	13,706	19,965	53,437	39,967
1933	140,473	77,305	63,168	12,153	21,487	65,152	41,681
1934	143,032	84,915	58,117	15,975	22,110	68,940	36,007
1935	141,352	72,881	68,471	10,916	34,256	61,965	34,215
1936	176,991	101,032	75,959	15,232	33,783	85,800	42,176
1937	168,070	105,907	62,163	12,832	25,170	93,075	36,993
1938	178,187	120,813	57,374	16,350	17,422	104,463	39,952
1939	186,434	100,518	85,916	14,257	34,575	86,261	51,341
1940	202,434	116,346	86,088	20,238	43,166	96,108	42,922
1941	137,752	91,627	46,125	...	...	...	...
1942	125,395	79,713	45,682	...	...	...	...
1943	90,588	51,690	38,898	...	...	...	...
1944	72,800	48,400	24,400	25,100 f/	18,800 f/	23,300	5,600
1945	30,900	17,800	13,100	11,900 f/	10,900 f/	5,900	2,200
1946	37,023	37,023	...	37,023 f/g/	...	h/	...

SOURCE: U.S. Department of the Interior, Fish and Wildlife Service, Japanese Fisheries Production, 1908-1946. Fisheries Leaflet No. 279. Washington, D.C., 1948.

a/ Landings by craft based on Japan proper; landings from overseas fisheries apparently did not include tuna.
b/ Called "Coastal and Inland Fisheries."
c/ Often called "bonito" in Japanese publications in English.
d/ Including yellowfin, bluefin, albacore, and allied species such as the spearfishes.
e/ Including swordfish in 1920 and 1921.
f/ Reported production. Actual production was higher as some landings were unreported in these years. The unreported landings were highest in 1946.
g/ Including production of offshore fisheries.
h/ Included in production of coastal fisheries.

Table 62. - JAPAN: Landings of skipjack and other tuna, 1920-44 a/

(Annual average and percentual composition)

Annual average for:	Total landings			Coastal b/		Offshore	
	All species	Skipjack c/	Other tuna d/	Skipjack c/	Other tuna d/	Skipjack c/	Other tuna d/
1920-24 (5 years)							
Metric tons	97,414	74,225	23,189	25,744	12,178	48,481	11,011
Percentage	100.0	76.2	23.8	26.4	12.5	49.8	11.3
1925-29 (5 years)							
Metric tons	119,025	74,625	44,400	14,664	15,094	59,961	29,306
Percentage	100.0	62.7	37.3	12.3	12.7	50.4	24.6
1930-34 (5 years)							
Metric tons	137,587	75,699	61,888	12,865	20,743	62,834	41,145
Percentage	100.0	55.0	45.0	9.3	15.1	45.7	29.9
1935-39 (5 years)							
Metric tons	170,207	100,230	69,977	13,917	29,041	86,313	40,936
Percentage	100.0	58.9	41.1	8.2	17.1	50.7	24.0
1940-44 (5 years)							
Metric tons	125,794	77,555	48,239	...	...	...	...
Percentage	100.0	61.7	38.3	...	...	...	...
1920-39 (20 years)							
Metric tons	131,058	81,195	49,863	16,798	19,264	64,397	30,599
Percentage	100.0	62.0	38.0	12.8	14.7	49.2	23.3

SOURCE: Table 61, presenting annual data for the individual years 1920-46.

a/ Landings in Japan proper by craft based on Japan; landings from overseas fisheries apparently did not include any tuna species.
b/ Called "Coastal and Inland Fisheries."
c/ Often called "bonito" in Japanese publications in English.
d/ Including albacore, yellowfin, bluefin tuna and other allied species such as the spearfishes.

Table 63. - UNITED STATES OF AMERICA: Landings of Tuna Species, 1920-48

Year	Total: Atlantic and Pacific coasts	Atlantic coast a/			Pacific coast					
		Total	Bluefin	Bonito	Total	Albacore	Skipjack	Yellowfin	Bluefin	Bonito
	(Metric tons)									
1920	...	...	...	...	20,722	8,563	3,609	891	7,263 b/	396
1921	...	...	...	...	9,779	6,930	517	559	1,627 b/	146
1922	...	...	...	...	16,774	6,043	5,381	3,328	1,601 b/	421
1923	...	...	...	...	18,095	5,677	5,199	4,915	1,798 b/	506
1924	...	...	...	...	13,320	8,026	1,715	1,390	1,718 b/	471
1925	...	...	...	...	24,847	10,073	6,457	6,005	1,919 b/	393
1926	...	...	...	...	20,818	1,120	9,523	5,699	3,079 b/	1,397
1927	32,805	629	187 c/	442	32,176	2,077	15,335	11,763	2,222 d/	779
1928	29,752	660	211 c/	449	29,092	128	7,173	14,629	6,215 d/	947
1929	34,794	725	187 c/	538	34,069	122	12,246	16,964	3,414	1,323
1930	47,381	475	191	284	47,406	130	9,292	25,698	9,943	2,343
1931	27,693	596	146 c/	450	27,097	17	7,488	16,592	1,603	1,397
1932	29,296	668	152 c/	516	28,628	281	9,815	16,748	486	1,298
1933	32,361	347	203	144	32,014	1	7,569	23,168	254	1,022
1934	44,339	348	203	145	44,191	55	6,727	27,629	8,327	1,453
1935	57,092	408	257	151	56,684	1,110	7,801	32,773	11,418	3,582
1936	60,518	430	255	175	60,088	447	12,244	35,540	8,584	3,273
1937	74,379	604	464	140	73,775	1,597	21,366	41,513	5,758	3,541
1938	66,627	1,229	827	402	65,398	8,040	10,276	35,524	8,041	3,517
1939	82,814	616	430	186	82,198	8,583	13,663	50,084	5,369	4,499
1940	96,878	1,546	524	1,022	95,332	6,578	25,696	51,600	9,058	2,400
1941	62,598	1,560	524	1,036	61,037	5,412	11,605	34,791	4,318	4,911
1942	54,625	993	375	618	53,632	10,678	17,570	18,809	5,826	749
1943	59,272	1,152	218	934	58,120	17,018	13,106	22,344	4,617	1,035
1944	76,699	888	376	512	75,811	23,947	13,624	28,642	9,228	370
1945	84,334	1,060	760 e/	300	83,274	17,909	15,127	39,666	9,341	1,231
1946 e/	100,689	928	692 e/	236	99,761	10,861	18,637	57,718	9,993	2,552
1947 e/	...	...	...	...	118,727	11,648	23,797	68,267	8,829	6,186
1948 e/	...	...	...	...	143,510	23,049	26,598	86,866	2,890	4,107

SOURCES: 1920-21: U.S. Department of the Interior, Fish and Wildlife Service, Fishery Statistics of the United States, 1945, Washington, D. C.: Government Printing Office, 1948; 1922-26: U.S. Department of Commerce, Bureau of Fisheries, Fishery Industries of the United States, 1927, Document No. 1050, Washington, D. C.: Government Printing Office, 1929; 1927-38: U.S. Department of Commerce, Bureau of Fisheries, Fishery Industries of the United States, Annual Report. Washington, D. C.: Government Printing Office; 1939-44: U.S. Department of the Interior, Fish and Wildlife Service, Fishery Statistics of the United States, Annual Report, Washington, D. C.: Government Printing Office; 1945: U.S. Department of the Interior, Fish and Wildlife Service, Branch of Commercial Fisheries, Fisheries of the United States and Alaska, 1945, Washington, D. C.; 1946-48: U.S. Department of the Interior, Fish and Wildlife Service, Washington, D. C.

a/ Where no survey was made for the year indicated, and exact data are therefore unavailable, the most recent previous figure is used.
b/ Including a small amount of tuna listed as "mixed."
c/ Including a small amount of tuna listed as "albacore," "tuna," or "little tuna."
d/ Listed as "tuna" in source.
e/ Preliminary data.

Table 64. - UNITED STATES OF AMERICA: Pacific Coast Landings of Tuna Species, 1920-48

(Annual average and percentual composition)

Annual average for:	Total	Albacore	Skipjack	Yellowfin	Bluefin	Bonito
1920-24 (5 years)						
Metric tons	15,738	7,048	3,284	2,217	2,801	388
Percentage	100.0	44.8	20.8	14.1	17.8	2.5
1925-29 (5 years)						
Metric tons	28,200	2,704	10,146	11,012	3,370	968
Percentage	100.0	9.6	36.0	39.0	12.0	3.4
1930-34 (5 years)						
Metric tons	35,867	97	8,178	21,967	4,122	1,503
Percentage	100.0	0.3	22.8	61.2	11.5	4.2
1935-39 (5 years)						
Metric tons	67,629	3,956	13,070	39,087	7,834	3,682
Percentage	100.0	5.9	19.3	57.8	11.6	5.4
1940-44 (5 years)						
Metric tons	68,786	12,727	16,320	31,237	6,609	1,893
Percentage	100.0	18.5	23.7	45.4	9.6	2.8
1945-48 (4 years)						
Metric tons	111,318	15,867	21,040	63,129	7,763	3,519
Percentage	100.0	14.2	18.9	56.7	7.0	3.2
1920-39 (20 years)						
Metric Tons	36,859	3,451	8,670	18,571	4,532	1,635
Percentage	100.0	9.4	23.5	50.4	12.3	4.4

SOURCE: Table 63, presenting annual data for the individual years 1920-48.

Table 69. - Production of canned tuna and bonito : United States of America, 1920-48 a/

Year	All species			Albacore			Skipjack			Yellowfin			Bluefin			"Tonno"	Bonito		
	Total	Solid c/	Flake	Total	Solid c/	Flake	Total	Solid c/	Flake	Total	Solid	Flake	Total	Solid	Flake	b/	Total	Solid c/	Flake
	(Metric tons d/)									(Metric tons d/)									
1920	9,162	...	...	4,347	...	...	1,217	...	...	432	...	...	3,166	...	...	-	-	-	-
1921	5,229	...	...	4,345	...	...	267	...	...	617 e/	...	...	e/	...	...	-	-	-	-
1922	6,359	...	...	2,821	...	...	1,695	...	...	1,609 e/	...	...	e/	...	...	131	103	...	...
1923	7,694	...	...	2,953	...	...	919	...	...	2,493 e/	...	...	e/	...	...	1,185	144	...	...
1924	6,059	...	...	3,970	...	...	411	...	...	628 e/	...	...	e/	...	...	927	123	...	...
1925	10,335	10,111	224	4,897	4,673	224	1,602	1,602	-	2,046 f/	2,046 f/	-	445 f/	445 f/	-	1,249	96	96	-
1926	7,824	7,619	205	582	573	9	2,755	2,697	58	2,203 g/	1,895 g/	128 h/	696 g/	696 g/	h/	1,312	456	446	10
1927	11,497	11,092	405	1,245	1,217	28	3,938	3,889	49	4,589 i/	4,269 i/	320 i/	440 i/	432 i/	8 i/	1,108	177	177	-
1928	11,387	11,002	385	990	885	105	1,918	1,895	23	5,953 j/	5,698 j/	255 j/	1,087 j/	1,085 j/	2 j/	1,209	230	230	-
1929	13,970	13,143	827	1,405	1,350	55	3,660	3,538	122	6,484 k/	5,874 k/	610 k/	965 k/	925 k/	40 k/	1,125	331	331	-
1930	18,548	17,498	1,050	1,372	1,347	25	2,510	2,477	33	9,198	8,388	810 l/	3,098	2,917	181	1,520	850	849	1
1931	11,442	10,731	711	1,486	1,389	97	2,246	2,148	98	6,128	5,666	462	440	398	42	635	507	495	12
1932	11,287	10,315	972	688	629	59	2,476	2,346	130	6,402	5,636	766 l/	88	71	17	1,162	471	471	n/
1933	13,178	12,282	896	510	481	29	2,137	2,071	66	8,785 m/	7,988	797	39	35	4	1,303	404	404 n/	n/
1934	18,418	17,168	1,250	852	782	70	2,146	2,086	60 o/	10,315	9,296	1,019 o/	2,957	2,856	101	1,595	553	553	-
1935	22,778	21,322	1,456	1,151	1,069	82	2,719 p/	2,679	40 p/	12,146	11,093	1,053	3,854	3,573	281	1,532	1,376 p/	1,376	p/
1936	24,013	22,543	1,470	593	546	47	4,079	4,040	39 o/	13,488	12,270	1,218 o/	2,963	2,797	166 o/	1,641	1,249	1,249	-
1937	28,981	26,751	2,230	1,069	940	129	6,590	6,410	180	15,427	13,704	1,723 o/	2,036	1,838	198 o/	2,409	1,450	1,450	-
1938	25,126	23,270	1,856	3,591	3,179	412 o/	3,300	3,197	103 o/	12,244	11,060	1,184 o/	3,149	2,992	157 o/	1,337	1,505	1,505	-
1939	33,717	29,595	4,122	5,745	4,684	1,061	3,945	3,850	95	17,992	15,147	2,845 o/	2,084	1,963	121	2,096	1,855	1,855	-
1940	38,158	32,592	5,566	3,552	2,920	632	7,667	6,980	687	19,286	15,454	3,832 o/	3,026	2,624	402	3,593	1,034	1,021	13
1941	25,790	21,618	4,172	2,876	2,546	330	4,271	3,820	451	13,990	10,768	3,222 o/	1,600	1,441	159	925	2,128	2,118	10
1942	22,207	16,032	6,175	5,204	4,412	792	6,024	3,996	2,028	7,488	4,710	2,778 o/	2,641	2,089	552	526	324	299	25
1943	23,678	16,447	7,231	7,491	5,947	1,544	5,134	2,723	2,411	8,610	5,904	2,706	1,974	1,444	530	q/	469 q/	429 q/	40
1944	31,455	19,185	12,270 r/	10,883	8,183	2,700	1,919 s/	1,919	s/	15,977 s/	6,426	9,551 s/	2,304 s/	2,304	s/	274	98	79	19
1945	40,060	23,463	16,597	11,047	7,881	3,166	5,274	1,520	3,754	18,863	11,394	7,469	3,954	1,892	2,062	434	488	342	146
1946	41,956	26,061 t/	15,895 t/	5,994	4,340	1,654	6,135	2,571	3,564	22,874	14,447	8,427	4,401	2,388	2,013	1,518 t/	1,034	797	237
1947	51,636	35,196	16,440	6,560	4,995	1,565	8,805	6,248	2,557	29,116 u/	18,382 u/	10,734 u/	4,069	2,887	1,182	667	2,419	2,017	402
1948	61,663	40,213	21,450	11,892	8,988	2,904	9,454	6,141	3,313	36,416 v/	21,964 v/	14,452 v/	1,333	830	503	849	1,719	1,441	278

SOURCES: 1920: U.S. Tariff Commission, Report to the United States Senate on Tuna Fish. Report No. 109, second series. Washington, D.C.: Government Printing Office, 1936; 1921-26: U.S. Department of Commerce, Bureau of Fisheries, Fishery Industries of the United States, 1930. Washington, D.C.: U.S. Government Printing Office, 1931; 1925-38: U.S. Department of Commerce, Bureau of Fisheries, Fishery Industries of the United States, annual reports, Washington, D.C.: Government Printing Office; 1939-44: U.S. Department of the Interior, Fish and Wildlife Service, Fishery Statistics of the United States, annual report, Washington, D.C.: Government Printing Office; 1945-47: U.S. Department of the Interior, Fish and Wildlife Service, Canned Fish and By-products, annual summary, Washington, D.C.; 1948: U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C.

a/ Excluding non-contiguous territories.
b/ "Tonno" is Italian-style pack of solid tuna.
c/ "Solid" is synonymous with "meat."
d/ Except for 1920 data, which were converted from pounds, original data are in standard cases.
A standard case contains 48 cans, each with a gross weight of 226.8 grams (8.0 oz.). The net weight for each can of solid meat pack is 212.6 grams (7.5 oz.); for flake pack the net weight of each can is 170.1 grams (6.0 oz.). Standard cases were converted to metric tons using the following multipliers: solid pack - .00952539; flake pack - .00816462.
e/ "Bluefin" included with "yellowfin."
f/ 1,321 tons listed under "tuna, bluefin and yellowfin" are included with "yellowfin."
g/ 257 tons listed under "tuna, bluefin and yellowfin" are included with "yellowfin."
h/ "Bluefin, flake" included with "yellowfin, flake."
i/ 428 tons listed under "tuna, bluefin and yellowfin" are included with "yellowfin." By comparison of data, it was computed that 291 tons of this amount were solid tuna, and 137 tons, tuna flakes, and these quantities are included with the respective "yellowfin" figures.
j/ 315 tons listed under "mixed, yellowfin and bluefin" are included with "yellowfin." By comparison of data, it was computed that 244 metric tons of this amount were solid tuna, and 71 metric tons, tuna flakes, and these quantities are included with the respective "yellowfin" figures.
k/ 266 tons listed under "mixed, yellowfin and bluefin" are included with "yellowfin." By comparison of data, it was computed that 158 metric tons of this amount were tuna, and 108 metric tons, tuna flakes and these quantities are included with the respective "yellowfin" figures.
l/ Includes a small amount of mixed yellowfin and bluefin flakes.
m/ Includes a small amount of creamed yellowfin tuna.
n/ A small amount of flake bonito is included with bonito.
o/ Includes the pack of creamed tuna flakes.
p/ The pack of flake bonito has been included with flake skipjack.
q/ The pack of "tonno" is included with the pack of bonito.
r/ Listed as "flakes and grated."
s/ 955 tons, listed as "flakes and grated, light meat," probably including skipjack and bluefin flakes, as well as yellowfin flakes, are listed here under "yellowfin, flake."
t/ "Tonno" includes mixed flakes; the "tonno" figure is included with the "whole" total, to conform with previous years.
u/ 1,445 tons (784 solid pack and 661 flake pack) listed under "mixed species" are included with "yellowfin."
v/ 509 metric tons (255 solid pack and 254 flake pack) listed under "mixed species" are included with "yellowfin."

Table 66.- PRODUCTION OF CANNED TUNA AND BONITO: United States of America, 1920-48

(Annual average and percentual composition)

Annual average for:	All species			Albacore			Skipjack		
	Total	Solid	Flake	Total	Solid	Flake	Total	Solid	Flake
1920-24									
Metric tons	6,901	...	...	3,687	...	...	902	...	...
Percentage	100.0	...	...	53.4	...	...	13.1	...	...
1925-29									
Metric tons	11,003	10,594	409	1,824	1,740	84	2,775	2,725	50
Percentage	100.0	96.3	3.7	16.6	15.8	0.8	25.2	24.8	0.4
1930-34									
Metric tons	14,575	13,599	976	982	926	56	2,303	2,226	77
Percentage	100.0	93.3	6.7	6.8	6.4	0.4	15.8	15.3	0.5
1935-39									
Metric tons	26,923	24,696	2,227	2,430	2,084	346	4,127	4,035	92
Percentage	100.0	91.7	8.3	9.0	7.7	1.3	15.3	15.0	0.3
1940-44									
Metric tons	28,258	21,175	7,083	6,001	4,802	1,199	5,003	3,888	1,115
Percentage	100.0	74.9	25.1	21.2	17.0	4.2	17.7	13.7	4.0
1945-48									
Metric tons	48,829	31,233	17,596	8,873	6,551	2,322	7,417	4,120	3,297
Percentage	100.0	64.0	36.0	18.2	13.4	4.8	15.2	8.4	6.8
1925-39 (15 yrs.)									
Metric tons	17,500	16,296	1,204	1,745	1,583	162	3,068	2,995	73
Percentage	100.0	93.1	6.9	10.0	9.0	1.0	17.5	17.1	0.4

Annual average for:	Yellowfin			Bluefin			"Tonno"	Bonito		
	Total	Solid	Flake	Total	Solid	Flake		Total	Solid	Flake
1920-24										
Metric tons	1,789a/	...	...	a/	...	...	449	74	...	...
Percentage	25.9a/	...	...	a/	...	...	6.5	1.1	...	...
1925-29										
Metric tons	4,219	3,956	263	726	716	10	1,201	258	256	2
Percentage	38.4	36.0	2.4	6.6	6.5	0.1	10.9	2.3	2.3	0
1930-34										
Metric tons	8,166	7,395	771	1,324	1,255	69	1,243	557	554	3
Percentage	56.0	50.7	5.3	9.1	8.6	0.5	8.5	3.8	3.8	0
1935-39										
Metric tons	14,259	12,655	1,604	2,817	2,632	185	1,803	1,487	1,487	0
Percentage	53.0	47.0	6.0	10.5	9.8	0.7	6.7	5.5	5.5	0
1940-44										
Metric tons	13,070	8,652	4,418	2,309	1,980	329	1,064	811	789	22
Percentage	46.2	30.6	15.6	8.2	7.0	1.2	3.8	2.9	2.8	0.1
1945-48										
Metric tons	26,818	16,547	10,271	3,439	1,999	1,440	867	1,415	1,149	266
Percentage	54.9	33.9	21.0	7.0	4.1	2.9	1.8	2.9	2.4	0.5
1925-39 (15 yrs.)										
Metric tons	8,881	8,002	879	1,623	1,535	88	1,416	767	766	1
Percentage	50.7	45.7	5.0	9.3	8.8	0.5	8.1	4.4	4.4	0

SOURCE: Table 65, presenting annual data for the individual years 1920-47.

a/ "Bluefin" included with "yellowfin."

Table 67. - IMPORTS OF FRESH AND FROZEN TUNA: United States of America, 1924-48 a/

Year	Total	Japan	Canada	Mexico b/	Costa Rica	Other countries c/
	(Metric tons)					
1924	2,283	-	ϕ	2,283	-	-
1925	4,737	377	87	4,273	-	-
1926	4,490	-	74	4,390	-	26
1927	14,735	49	143	14,543	-	-
1928	13,767	1,608	73	12,086	-	-
1929	22,995	2,832	68	20,095	-	ϕ
1930	26,917	2,925	105	23,887	-	-
1931	3,564	3,090	64	403	-	7
1932	2,285	1,948	102	235	-	ϕ
1933	2,692	2,040	153	363	-	136
1934	2,764	2,600	122	42	-	-
1935	2,850	2,580	78	89	-	103
1936	2,474	2,121	67	286	-	-
1937	6,537	5,011	286	175	352	713
1938	6,211	2,018	99	330	3,546	218
1939	6,620	2,360	158	-	3,630	472
1940	3,261	690	87	132	1,704	648
1941	1,504	251	67	-	1,106	80
1942	1,718	-	58	74	1,081	505
1943	594	-	58	59	477	-
1944	1,576	-	266	-	795	515
1945	1,394	-	712	53	629	ϕ
1946	1,813	-	166	351	1,294	2
1947	4,175	-	407	415	3,303	50
1948	4,147	1,085	100	900	1,387	675

SOURCE: 1924-47: U.S. Department of Commerce, Bureau of Foreign and Domestic Commerce, Foreign Commerce and Navigation of the United States, 1924-47. Washington, D.C., Government Printing Office; 1948: U.S. Department of Commerce, Bureau of the Census, United States Imports for Consumption of Merchandise (Commodity by country of origin), Washington, D.C., March 1949.

a/ 1924-33 and 1946-47: General imports; 1934-45 and 1948: Imports for consumption.
b/ During 1924-30 some of the U.S. landings off the Mexican coast were classified as imports by the source for this table.
c/ Philippines, Nicaragua, Panama Canal Zone, Peru, Chile, Newfoundland and Labrador, Bahamas, Portugal, the Netherlands, and Ecuador.

Table 68. - IMPORTS OF TUNA CANNED IN OIL OR IN OIL SUBSTANCE: United States of America, 1931-48

Year	Total	Western Pacific countries			Eastern Pacific Countries				Caribbean countries b/	European countries and North Africa c/	Africa (excl. North Africa) d/
		Japan	Philippines	Other a/	Canada	Mexico	Peru	Chile			
	(Metric tons)										
1931	425	294	-	-	-	89	-	-	-	42	-
1932	2,697	2,300	-	-	-	340	-	-	-	57	-
1933	6,524	6,450	-	-	-	34	-	-	-	40	-
1934	3,749	3,433	141	ϕ	-	143	-	-	-	32	-
1935	3,713 e/	3,226	192	16	ϕ	26	-	-	-	14	2
1936	3,104	2,661	75	75	-	277	-	-	-	16	-
1937	5,014	4,446	48	77	-	577	-	-	-	66	-
1938	3,262	2,210	256	210	-	479	-	-	-	97	10
1939	4,593	3,522	449	325	-	153	-	-	-	104	40
1940	3,482	2,512	440	297	-	186	-	-	-	38	9
1941	1,511	810	651	9	-	31	-	-	-	8	2
1942	187	10	-	-	-	65	20	-	5	9	78
1943	232	-	-	-	-	39	155	19	19	ϕ	ϕ
1944	1,435	-	-	-	-	53	566	178	ϕ	638	-
1945	2,382	-	-	-	-	58	983	166 f/	-	1,032	143
1946	1,747	-	-	-	ϕ	30	1,261	34	85	316	21
1947	2,882	ϕ	-	-	85	-	2,082 g/	ϕ	-	608	107
1948	3,760	293	-	7	3	-	2,124	5	2	1,000	326

SOURCES: 1931-33: U.S. Tariff Commission, Report to the United States Senate on Tuna Fish, Report No. 109, Second Series, Government Printing Office, Washington, D.C., 1936; 1934-47: U.S. Department of Commerce, Bureau of Foreign and Domestic Commerce, Foreign Commerce and Navigation of the United States, Government Printing Office, Washington, D.C.; 1948: U.S. Department of Commerce, Bureau of the Census, United States Imports for Consumption of Merchandise (Commodity by Country of Origin), Washington, D.C., March 1949.

a/ Hong Kong, British Malaya, and China.
b/ Cuba, Haiti, Bahamas, and Canal Zone.
c/ France, French Morocco, Portugal, Azores, Spain, Italy, Turkey, Norway, Denmark, Algerie and Libya.
d/ Portuguese Angola and Guinea, Union of South Africa, and, in 1948, an insignificant amount from British East Africa.
e/ This quantity has been converted from the total as given in the original source. The aggregate for the country breakdown in this table is 3,476 metric tons.
f/ Includes negligible quantities imported from Argentina, Uruguay, and Costa Rica.
g/ Including 10 metric tons packed in dutiable oils.

TABLE 69. - IMPORTS OF CANNED TUNA: United States of America, January-December 1948 and January-March 1949, by months and country of origin

Commodity and country of origin	1948		1948											1949		
	Total value	Total quantity	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March
	(US dollars)	(Metric quintals)														
TUNA FISH IN OIL																
Western Pacific countries																
China	7,185	74	-	-	-	-	-	-	74	-	-	ϕ	ϕ	-	-	473	-
Japan	417,923	2,927	-	-	-	-	-	-	-	ϕ	429	1,086	628	784	42	1,415	868
Korea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29
Eastern Pacific countries																	
Canada	4,064	34	1	ϕ	1	1	6	24	-	ϕ	-	1	ϕ	ϕ	-	-	-
Chile	4,267	47	-	-	-	-	11	-	14	22	-	-	-	-	-	-	-
Peru	2,959,444	21,239	2,832	4,521	2,824	1,593	2,169	3,710	411	904	1,182	512	402	179	2,248	851	250
Caribbean																	
Canal Zone	1,697	22	-	-	-	-	-	-	-	-	-	22	-	-	-	-	-
Europe and North Africa																	
Azores	130,893	1,262	-	266	94	68	68	-	163	177	238	34	10	144	31	4	7
France	8,072	51	-	18	-	3	2	4	4	-	1	19	-	-	3	-	9
Italy	2,413	229	-	-	-	-	-	-	-	-	225	2	-	2	-	-	ϕ
Portugal	831,407	8,356	825	683	732	366	826	1,374	727	1,088	562	442	502	229	118	15	381
Spain	6,647	69	-	-	-	-	-	-	-	-	-	69	-	-	-	-	-
United Kingdom	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
Algeria	62	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
French Morocco	3,568	27	10	8	-	-	-	-	-	-	-	-	-	9	10	-	4
Libya	1,034	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Southeast Atlantic (Africa)																	
Angola	283,864	2,687	63	386	73	435	695	436	203	11	219	150	-	16	18	828	273
Other Portuguese Guinea	25,180	259	-	26	-	6	-	43	26	-	-	-	-	158	16	-	-
Union of South Africa	6,377	70	-	-	-	-	-	70	-	-	-	-	-	-	-	-	-
British East Africa	29,643	241	-	-	-	-	-	-	-	-	241	-	-	-	-	-	-
TOTAL	4,723,740	37,600	3,736	5,908	3,725	2,472	3,777	5,661	1,622	2,202	3,097	2,337	1,542	1,521	2,486	3,586	1,830
BONITO AND YELLOWTAIL																	
China	47	ϕ	-	-	-	-	ϕ	-	-	-	-	-	-	-	-	-	-
Chile	13,445	177	-	-	-	-	-	-	-	-	-	-	89	88	23	89	-
Peru	91,025	1,023	-	-	-	-	-	175	167	90	ϕ	-	-	591	6,787	4,428	7,913
Turkey	2,429	28	-	-	-	-	-	-	12	12	3	-	-	1	-	-	-
Cuba	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ϕ	-
Portugal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
TOTAL	106,946	1,228	-	-	-	-	ϕ	175	179	102	3	-	89	680	6,810	4,517	7,916

SOURCE: United States Imports for Consumption of Merchandise (Commodity by country of origin), Washington, D.C.: U.S. Department of Commerce, Bureau of the Census.

Table 70.- COMPOSITION OF CANNED TUNA SUPPLIES: United States of America, 1931-48

Year	A		B		C		D		E		F		G
	Domestic landings of tuna		Imports of fresh and frozen tuna		Total raw materials (A + B)		Domestic canned production (Produced from C, i.e., A + B)		Imports of canned tuna		Total supplies of canned tuna (D + E)		Computed contribution of imports to total supplies(B+E)
	Metric tons	Percent of C	Metric tons	Percent of C	Metric tons	Percent	Metric tons	Percent of F	Metric tons	Percent of F	Metric tons	Percent	Percent
1931	27,693	88.6	3,564	11.4	31,257	100.0	11,442	96.4	425	3.6	11,867	100.0	14.6
1932	29,296	92.8	2,285	7.2	31,581	100.0	11,287	80.7	2,697	19.3	13,984	100.0	25.1
1933	32,361	92.3	2,692	7.7	35,053	100.0	13,178	66.9	6,524	33.1	19,702	100.0	38.3
1934	44,539	94.2	2,764	5.8	47,303	100.0	18,418	83.1	3,749	16.9	22,167	100.0	21.7
1935	57,092	95.2	2,850	4.8	59,942	100.0	22,778	86.0	3,713	14.0	26,491	100.0	18.1
1936	60,518	96.1	2,474	3.9	62,992	100.0	24,013	88.6	3,104	11.4	27,117	100.0	14.9
1937	74,379	91.9	6,537	8.1	80,916	100.0	28,981	85.3	5,014	14.7	33,995	100.0	21.7
1938	66,627	91.5	6,211	8.5	72,838	100.0	25,126	88.5	3,262	11.5	28,388	100.0	18.0
1939	82,814	92.6	6,620	7.4	89,434	100.0	33,717	88.0	4,593	12.0	38,310	100.0	18.5
1940	96,878	96.7	3,261	3.3	100,139	100.0	38,158	91.6	3,482	8.4	41,640	100.0	11.4
1941	62,598	97.7	1,504	2.3	64,102	100.0	25,790	94.5	1,511	5.5	27,301	100.0	7.7
1942	54,625	97.0	1,718	3.0	56,343	100.0	22,207	99.2	187	0.8	22,394	100.0	3.8
1943	59,272	99.0	594	1.0	59,866	100.0	23,678	99.0	232	1.0	23,910	100.0	2.0
1944	76,699	98.0	1,576	2.0	78,275	100.0	31,455	95.6	1,435	4.4	32,890	100.0	6.4
1945	84,334	98.4	1,394	1.6	85,728	100.0	40,060	94.4	2,382	5.6	42,442	100.0	7.1
1946	100,689 a/	98.2	1,813	1.8	102,502	100.0	41,956	96.0	1,747	4.0	43,703	100.0	5.7
1947	118,727 a/	96.6	4,175	3.4	122,902	100.0	51,636	94.7	2,882	5.3	54,518	100.0	8.5
1948 a/ ..	143,510	97.2	4,147	2.8	147,657	100.0	61,663	94.1	3,883	5.9	65,546	100.0	8.6

SOURCE: Other tables in this study.

a/ Preliminary data.

Table 71. TUNA PRICES PAID TO FISHERMEN PER SHORT TON:a/ United States of America, 1917-48

Year	Albacore		Skipjack		Yellowfin		Bluefin	
	U.S. dollars	Index 1937-100	U.S. dollars	Index 1937-100	U.S. dollars	Index 1937-100	U.S. dollars	Index 1937-100
1917	30	14	40	40	50	42	45	41
1918	125	58	40	40	90	75	80	73
1919	200	93	40	40	90	75	80	73
1920	300	140	40	40	90	75	80	73
1921	145	67	60	60	80	67	80	73
1922	250	116	60	60	100	83	80	73
1923	300	140	60	60	80	67	75	68
1924	360	167	60	60	80	67	80	73
1925	200	93	60	60	80	67	80	73
1926	175	81	75-80	75-80	110	92	110	100
1927	...	...	75	75	110	92	90	82
1928	200 up	93 up	75	75	120	100	90	82
1929	300	140	70-80	70-80	120	100	110	100
1930	200	93	90	90	120	100	110	100
1931	200	93	90-80	90-80	120-100	100-83	90	82
1932	200	93	70	70	80	67	75	68
1933	200	93	80	80	100	83	90	82
1934	200	93	80	80	100	83	90	82
1935	125-160	58-74	80	80	100	83	90	82
1936	...	...	85-90	85-90	105-110	87-92	95-90	86-82
1937	215	100	100	100	120	100	110	100
1938	115-130	100-60	100	100	120	100	110	100
1939	125	58	90	90	110	92	100	91
1940	140	65	100	100	110	92	110	91
1941	140	65	100-110	100-110	110-130	92-108	110-120	100-109
1942	300-400	140-186	170	170	190	158	180	164
1943	325	151	180	180	200	167	190	173
1944	325-390	151-181	180	180	200	167	190	173
1945	390	181	180	180	200	167	190	173
1946	390-440	181-205	180-260	180-260	200-280	167-233	190-270	173-245
1947	410-600	191-279	290-320	290-320	310-340	258-283	300	273
1948	550-740-425	256-344-198	320	320	340	283	330	300

SOURCE: Pacific Fisherman, 1949 Yearbook Number, Seattle: 1949.

a/ Prices quoted are per short ton (2,000 pounds or 0.90718 metric tons) of round fish in good condition landed at cannery dock. All fish rejected by inspectors, either as landed or after precooking, are deducted from the gross weight.

TECHNOLOGICAL PUBLICATIONS

FISHERIES IN GENERAL

Fiskeri Kalenderen. Per Rogstad and Magne Midsem...Asm. Andersens Forlag, Oslo, Norway, 1949. 576 pp. In Norwegian.

This book contains a complete collection of Norwegian laws and regulations on fishing and fishery products. The many regulations on the handling, packing, and shipping of fresh fish, salted fish, canned fish, etc., are of particular interest.

FISHING

Experimental Fishing Trip to Bering Sea. Joseph E. King. Fishery Leaflet 330....United States Department of the Interior, Fish and Wildlife Service, Washington 25, D. C., March 1949. 13 pp., illus. In English.

The leaflet describes the results obtained in crab fishing by a trawler rigged to operate with a stern set type of gear and compares them with those obtained by a trawler of the type ordinarily used in the North Atlantic. It also describes the processing of crabs on board the vessel.

. . .

Introduction to Trawling. A. Hodson. Published by the Author, 80 Spring Bank, Grimsby, England, 1948. 63 pp., illus. In English. Price 8s. 6d. post free.

This book gives a very complete description of the otter trawl as used in the British trawling industry. It contains clear pictures of the various parts of a trawl and describes different types of trawls and trawl accessories. It also describes the handling of the trawl and gives instructions for net mending.

. . .

Notes on Shrimp Fishing Along The New England Coast. Lionel A. Walford. Fishery Leaflet 318...United States Department of the Interior, Fish and Wildlife Service, Washington 25, D. C., September 1948. 8 pp., illus. In English.

This pamphlet describes some recommendations which a Norwegian captain, experienced in shrimp fishing in Norway, has made for shrimp fisheries along the New England coast in the U.S.A. It describes the proposed shrimp trawl and gives suggestions for the cooking and packing of the shrimp on board the boats.

FISHING GEAR

Trawling Gear in California. W. L. Scofield. Fish Bulletin No. 72...State of California Department of Natural Resources, Division of Fish and Game, California, 1948. 60 pp., illus. In English.

This bulletin describes the different types of trawling gear which have been in use in California and gives detailed information regarding questions such as mesh size, construction of nets, and number of thread used in the various parts of the trawl. It also contains a brief description of the use of these nets.

. . .

Commercial Fishermen's Reference Book. R. J. Ederer Company, 540 Orleans Street, Chicago, Illinois, 1948. 51 pp., illus. In English.

This booklet, which is published by a net-making concern, has instructive pictures of the various types of fishing nets and explains in general terms their principle and operation. It also gives some information regarding twine and ropes for nets.

. . .

Schleppnetzgarne aus Manila, Weichhanf und Perlon. Gerhard Klust...Institut für Netzforschung, Kirchenallee 57, Hamburg, Germany, 1948. Reprinted from Archiv für Fischereiwissenschaften. 15 pp., illus. In German with English summary.

This book describes the fitness of different yarns for trawl nets. The properties of yarns taken into consideration are swelling, weight in water, drying ability, extension, and resistance to scrubbing, splitting, and rotting. Manila hemp, which is made from the leaves of a kind of banana, is well fitted for trawl nets in all respects. Soft hemp is not recommended as its weight in water is great, it dries slowly, has low resistance against scrubbing, and rots quickly. It should be used only in an emergency. Green hemp, a type of soft hemp which is not steeped, is quite unfit. Perlon, an artificial German fiber, is in all respects better than the other materials tested, especially since it does not rot.

. . .

Netzweichheit und Netzärte, Ein Beitrag zum Bergriff der Fängigkeit bei Kiemennetzen. Andres v. Brandt...Institut für Netzforschung, Kirchenallee 57, Hamburg, Germany, 1948. Reprinted from Archiv für Fischereiwissenschaften. 9 pp., illus. In German with English summary.

The importance of the softness of gill nets is described. Using a new method, the author determines the softness by measuring the power which is required to stretch a sling of yarn. By help of this method softness of various nets under different conditions is examined. It was found that cotton nets in general are softer dry than wet. Only oiled cotton nets are softer wet than dry. Flax nets are softer wet than dry. No relation could be found between the loss in resistance. Preservation of the nets made both cotton and flax nets harder.

LIVE FISH

Keeping Live Shrimp for Bait. Fishery Leaflet 337...United States Department of the Interior, Fish and Wildlife Service, Washington,25, D. C., April 1949. 2 pp. In English.

Methods for keeping shrimp alive in floating wooden boxes or similar equipment are described.

FRESH FISH

The Care of the Trawler's Fish. G.A. Reay and J. M. Shewan. Department of Scientific and Industrial Research, Food Investigation Leaflet No. 3...His Majesty's Stationery Office, London, England, 1949. 10 pp. In English. Price 4d.

The leaflet describes methods for keeping holds of fishing boats clean and for icing and handling of fish on board.

. . .

Markets for Airborne Seafoods. S. A. Larsen, W. Reitz and K. K. Burgum. Wayne University Studies in Air Transport No. 5... U.S.A., 1948. 120 pp., illus. In English.

This study describes the results of some experiments with air shipments of various types of seafood. The experiments included such considerations as best packing, etc. It also gives detailed consideration to the question of cost of air shipment as compared with ordinary shipments and the new potentialities that air transport may offer to the fishing industry.

CANNING

Desalting of Snoek for Canning. G.M. Dreosti. Memorandum No. 1, 27 July, 1947. Desalted and Canned Snoek. G. M. Dresoti. Memorandum No. 6, 28 October 1947...Fishing Industry Research Institute, Cape Town, Union of South Africa. No. 1, 1 p. No. 6, 2 pp. In English.

These Memorandums give results obtained from salting of snoek before canning and describes the best methods for de-salting.

. . .

Brine for Crawfish Canning. G. M. Dreosti and R.P.v.d. Merwe. Memorandum No 13...Fishing Industry Research Institut, Cape Town, Union of South Africa, March 1948. 2 pp. In English.

This memorandum describes the brining of crawfish prior to canning and discusses the possible disadvantages from the use of sea water.

. . .

Tomato Sauce in Fish Packs. G. M. Dreosti and L. M. Bloch. Memorandum No. 14...Fishing Industry Research Institute, Cape Town, Union of South Africa, May 1948. 13 pp. In English.

The manufacture, composition, etc., of tomato pulp and purées and the use of these products in fish canning are discussed.

. . .

Canning of Pilchards, Maasbanker and Harder. G. M. Dreosti. Memorandum No. 15...Fishing Industry Research Institute, Cape Town, Union of South Africa August 1948. 18 pp. In English.

Detailed instructions are given regarding the procedures for canning and tentative minimum standards are described. The maasbanker is a fish of the jack group; in Europe it is generally called horse-mackerel. The harder belongs to the mullet group.

. . .

Studies on Substitute Containers for Canned Fishery Products. Norman D. Jarvis and Lynne G. McKee. Special Scientific Report No. 36...United States Department of the Interior, Fish and Wildlife Service, Washington 25, D. C., 1948. 25 pp. In English.

This report summarizes observations made during the examination of test packs of various fishery products commonly canned in the U.S.A. Packs have been made in cans of various types of electrolytic tin plate, bonderized plates, various lacquers, etc. The investigation itself was carried out during the war.

CRUSTACEANS

A): An Easy Way of Removing the Flesh from Crawfish Legs. B) An Easy Way of Checking and Cleaning Crawfish Tails Internally. G. M. Dreosti. Memorandum No. 17...Fishing Industry Research Institute, Cape Town, Union of South Africa, August, 1948. 2 pp. In English.

The removal of flesh from crawfish legs and the internal cleaning of crawfish tails by the use of a water jet are described.

WHALE PRODUCTS

Vitamins in Whale Liver. Olaf R. Braekkan. Det Norski Videnskaps-Akademi i Oslo, Hvalradets Skrifter Nr. 32... Jacob Dybwad, Oslo, Norway, 1948. 25 pp., illus. In English.

The results of a considerable number of vitamin determinations in oil obtained from whale livers collected in the Antarctic in the 1945-47 seasons are presented.

MISCELLANEOUS PRODUCTS

Fish Reduction Processes. Charles Butler. Fishery Leaflet 126...United States Department of the Interior, Fish and Wildlife Service, Washington 25, D.C., April 1949. 16 pp., illus. In English.

A general description is given of the methods for fish reduction, as well as some data on cost. It also contains a description of methods and equipment in general use and a flow sheet for the production of fish solubles from stickwater.

. . .

The Effect of Condensed Fish Solubles as a Supplement to a Chick Ration. C. P. Hart, T. C. Higgins and W. H. Wiley. Miscellaneous Publication No. 35...Rhode Island Agricultural Experiment Station, Rhode Island State College, Kingston, Rhode Island, U.S.A., March 1948. 4 pp. In English.

This paper describes results of feeding experiments with fish solubles and discusses the cost involved compared with the improvements obtained.

Fisheries Division
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
1201 Connecticut Avenue, N. W.
Washington 6, D. C.

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The FAO Fisheries Division will welcome comments and suggestions for this Bulletin.

OTHER FAO FISHERIES PUBLICATIONS

FAO Yearbook of Fisheries Statistics - 1947

Published in Washington, D. C., in August 1948. Price $4.00. Bilingual, English and French, with Preface in Spanish. Photo-offset. 368 pp. Part I of this volume consists of 143 statistical tables on the import and export trade of 61 countries in fish and fisheries products since 1930. Part II contains 86 tables on (a) landings and (b) miscellaneous subjects such as the number of fishermen, craft, etc., for about 20 countries.

OTHER FAO STATISTICAL PUBLICATIONS

Yearbook of Food and Agricultural Statistics - 1948

Bilingual, English and French, with Spanish notes.
Photo-offset. xviii + 284 pp.
Price $3.50.
(1947 edition, 280 pp., $2.50 paper bound on $3.00 cloth bound, available).

Yearbook of Forest Products Statistics - 1948

Bilingual, English and French, with Spanish supplement.
Printed. ix + 206 pp.
Price $2.50.
(1947 edition, 212 pp., $2.00, also available).

Monthly Bulletin: Food and Agricultural Statistics

Trilingual, English, French, and Spanish.
Photo-offset. 32 pp.
Price 25 cents.

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